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Observations on the progress  
of Population x x x x

1798

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To Dr. Wm. P. C. Praxton

from his affect. father

W. P. Praxton



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# OBSERVATIONS

ON THE

## Progress of Population,

*And the probabilities of the Duration of Human Life,  
in the United States of America.*

READ BEFORE THE AMERICAN PHILOSOPHI-  
CAL SOCIETY HELD AT PHILADELPHIA, FOR  
PROMOTING USEFUL KNOWLEDGE.

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BY WILLIAM BARTON, M. A.

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*[The main body of the document consists of several paragraphs of text. The handwriting is cursive and the ink is very faded, making the specific words and sentences difficult to decipher. The text appears to be a formal letter or a report, given the structured nature of the paragraphs.]*

*Observations on the probabilities of the Duration of Human Life, and the progress of Population, in the United States of America; in a Letter from WILLIAM BARTON, ESQ. to DAVID RITTENHOUSE, L. L. D. President, A. P. S.*

DEAR SIR,

Read Mar.  
18, 1791.

I BEG leave to communicate to our Philosophical society, the following observations, *on the probabilities of the duration of human life, in this country*;—and, likewise, *on the progress of its population*; together with the causes which accelerate that progression, in a degree unparalleled elsewhere. By comparing the results, with similar estimates made for some European countries—the advantages on the side of the United States, in these respects, will be readily discerned.

There is not, perhaps, any political axiom better established, than this,—That a high degree of\* population contributes greatly to the riches and strength of a state. In fact, the progressive increase of numbers, in the people of any civilized country, is reciprocally the cause and effect of its real wealth: and, therefore, there cannot be a surer criterion by which we may judge, whether a nation be, in reality, on the rise or on the decline, than by observing, whether the number of its inhabitants increase or diminish.

If, then, numbers of people constitute (or, at least, contribute to) the strength and riches of a state; that country, whose population is rapidly advancing, may fairly be said to be increasing in both these concomitants of national prosperity, with proportionable celerity. For, if a country exhibits so unequivocal a test of strength and  
VOL. III. D riches,

\* "The encouragement of population ought to be one of the first objects of policy, in every State." Dr. Price.

riches, as that circumstance indicates,---a good system of government, well administered, must insure its prosperity (so far as human efforts can produce the end;) notwithstanding the transitory effect of such incidents, as have no necessary connection with, or permanent influence upon, the fundamental sources of a nation's welfare: These could only occasion a temporary derangement in the political œconomy of the state, whereby the operation of the national resources might, for a time, be suspended; during which interval there might be an appearance (or even an actual existence, in some degree,) of public debility and distress.

If these observations be applied to the United States of America, it will appear, that this country possesses, in a superior degree, an inherent, radical and lasting source of national vigor and greatness:---For, it will be found, that, in no other part of the world, (at least, in none of those parts with which we are best acquainted) is the progress of population so rapid, as in these states.---And this increase arises from the salubrity of the climate; the great fruitfulness and resources of the country; the consequent facility of acquiring the means of a comfortable subsistence, which, aided by the benign influence of our government, produces\* early marriages;---and, lastly, from the† virtuous and simple manners of the great body of our inhabitants. These are either the proximate or remote causes, which accelerate the population of this favoured land; independently of accessions to our numbers, occasioned by migrations from foreign countries. As

\* In a letter written in the year 1768, by our venerable Franklin, to John Alleyne; Esq. (in answer to one wherein Mr. Alleyne had requested to know the Doctor's impartial thoughts, on the subject of an early marriage,) there is this passage.---“ With us in America, marriages are generally in the morning of life,---our children are therefore educated, and settled in the world, by noon; we have an afternoon and evening of cheerful leisure to ourselves,---such as your friend at present enjoys. By these early marriages, we are blest with more children; and, from the mode among us---founded in nature---of every mother suckling and nursing her own child, more of them are raised. Thence the swift progress of population, among us,---unparalleled in Europe!”

† “ A nation shall be more populous, in proportion as good morals and a simplicity of taste and manners prevail; or, as the people are more frugal and virtuous.”---Wallace's Dissertation on the numbers of mankind, in ancient and modern times.

As a plenitude of inhabitants is of so much importance to the interests of a nation, numerous estimates have been made, of the state and progress of population in divers countries; and the circumstances are designated which occasion its growth or declension, in different places and at particular seasons. The results of † estimates, on this subject, furnish useful reflections to a contemplative mind: they are not only instructive to the moralist and pleasing to the mere speculative philosopher; but they are peculiarly interesting to the statesman and the medical enquirer.

In order to shew the difference between the progress of population in this country, and that in some parts of the old world, as well as in the probabilities of the duration of life in each, respectively,—I shall offer some remarks from such *data*, as, I presume, will be satisfactory on the occasion. Although the kind of documents, on which calculations of this nature are usually founded, could not, in relation to this country, be obtained in so perfect a state, as to warrant very accurate inferences from them, in *every* particular,—the deductions, in general, are nevertheless not far from the truth.—It is greatly to be wished, that the several religious denominations of christians, throughout the United States,—at least, in our considerable towns and well settled parts of the country,—would be at the pains of obtaining and publishing, every year, lists of the births and deaths in their respective parishes or congregations; together with the proportion of the sexes in each list, the ages of the deceased, their diseases, and the numbers dying in each month. The number of marriages should also be added: and it would, moreover, be useful

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† “La population est un des plus sûrs moyens de juger de la prospérité d’un empire; et les variations qu’elle éprouve, comparées aux événemens qui les précèdent, sont la plus juste mesure de l’influence des causes physiques et morales, sur le bonheur ou sur le malheur de l’espèce humaine.”—See a paper on the births, marriages and deaths, at Paris, &c. by M. de la Place, Hist. Royal Acad. sciences, for 1783.

“La connoissance des probabilités de la durée de la vie, est une des choses les plus intéressantes dans l’histoire naturelle de l’homme.”—See M. de Buffon’s essay on the probabilities of the duration of life—in the supplement to the Nat. History.



to notice in what instances those dying after eighty years of age were foreigners. But a laudable spirit of enquiry is gaining ground among us, so fast, that there is reason to expect the introduction of great regularity and precision in such arrangements, in the several departments of our public œconomy, as may lead to further attainments in useful knowledge, and particularly to improvements in this branch of science.

In pursuing this subject, it becomes necessary to state those facts, from which, as *data*, deductions are usually made, for the purpose of ascertaining the condition of any given country, with respect to its population. And, after shewing the result of similar statements, here, and comparing them with such as have been made the groundwork, in estimates relating to European countries, the balance in favor of this country will be evident.

Marriage is the source of population. Therefore, the greater is the proportion of marriages in any country, the greater will be its proportion of births.—It appeared, by a collection of the yearly bills of mortality, published in London, in 1759, by Mr. Corbyn Morris,—that, in *England*, each marriage produces four children. Dr. Short, in his comparative history of the increase of mankind, says, that, in order to be fully satisfied respecting the numbers of persons to be allowed to a family, he obtained the true number of families and individuals in fourteen market-towns, some of them considerable in trade and populousness; and that they contained 20,371 families, and 97,611 individuals;—or, but little more than  $4\frac{1}{4}$  to a family. He adds, that, in order to find the difference in this respect, between towns and country-parishes, he procured, from divers parts of the kingdom, the exact number of families and individuals, in sixty-five country-parishes. The number of families was 17,208,—individuals, 76,284; or, not quite  $4\frac{1}{2}$  to a family. Dr.

Davenant,

Davenant, from the observations of Mr. King, gives  $4\frac{1}{17}$  as the number of persons to a family, *for the whole kingdom*.—By the state of births, marriages and deaths, in the city and Fauxbourgs of Paris, from 1771 to 1784 (both inclusive,) each marriage produced the proportion of  $3\frac{9}{100}$  births. The marriages and births at Paris, for 22 years (viz. from 1745 to 1766, both inclusive) as stated by the Count de Buffon, give the proportion of  $4\frac{3}{100}$  births to a marriage. But M. Buffon supposes, that about one half the foundlings (les enfans trouvés) ought to be included in the list of births for that city; instead of their whole number, which averaged, during those twenty-two years, 4,509 per annum: deducting, therefore, one half of the foundlings from the total number of births, and each marriage gives the proportion of  $3\frac{8}{100}$  births. The Abbé D'Expilly has given a statement of the births, deaths and marriages for the whole kingdom of France, including Lorraine and Bar, from 1754 to 1763, comprehending a term of nine years; and likewise one for France, exclusive of those provinces, during the same term. By both these statements it appears, that each marriage gives the proportion of  $4\frac{1}{2}$  births, for that kingdom.—In the Pais de Vaud, in Switzerland, on a medium of ten years, the proportion of marriages to births, was—as 1 to  $3\frac{2}{10}$ . According to Dr. Price, the proportions of marriages to births are, at Berlin, 1 to  $3\frac{9}{100}$ —at Copenhagen, 1 to  $3\frac{5}{100}$ —and at Amsterdam, 1 to  $1\frac{9}{100}$ .—In the Island of Corfica, indeed, during the years 1781 and 1782, there were five births to a marriage, according to the tables of births, deaths and marriages, within the French Dominions in Europe—(published by M. de la Place, in the memoirs of the Royal Academy of Sciences for 1783.) But this is a solitary instance of so large a proportion of births to marriages: and, being for a small island, scarcely containing 129,000 inhabitants, it is not proper to take it into an estimate, on this occasion.

From

From the foregoing statements it may be presumed, that four and an half persons to a house, and the same proportion of births to a marriage, are an allowance quite high enough for some of the healthiest parts of Europe, comprehending a large extent of territory.—There is but one instance, in which I have been enabled to obtain the actual proportion of marriages to births, in this country—At the first parish in Hingham, in the state of Massachusetts, during the course of fifty-four years, there were two thousand two hundred seven and forty births, one thousand one hundred and thirteen deaths, and five hundred and twenty one marriages; which gives the proportion of six and a quarter births to a marriage. If the number of inhabitants in this parish had remained stationary, during the whole term of fifty-four years,—and if one out of forty-five had died there, annually; it would have contained nine hundred and twenty-seven souls—Therefore, the proportion of births to marriages, in that parish, being taken out of so considerable a number of persons, and for so long a time, inclines me to think it may serve as a pretty just standard for the country parts of the northern, and, perhaps, of the middle states.—But, not being possessed of documents of this kind, for other parts of the Union, I shall assume the proportion of persons to a house, or to a family, as the next best means for ascertaining the proportion of births to marriages.—When we find a large proportion of persons to a family, taking a country *en gros*, it may be reasonably presumed that the births are numerous in the same ratio: And the most obvious causes, which produce this effect, have already been noticed. It has been observed, that, in some of the healthiest and most considerable portions of Europe, four and an half persons to a house is a large allowance for those countries. The late census of the inhabitants in the state of Massachusetts shews, that there are in that state, upwards of five and  
two

two thirds souls to a *family*, in that state---exclusive of Indians and Negroes—The proportion to a *house* is  $6\frac{8}{1000}$ : For, the *families* are to the *houses*, in that state, as six to five. In Boston, there are to a *family*,  $5\frac{3}{1000}$  souls: and in the three next largest towns, placed in the order of their magnitude, the proportions of persons to a family, are as follow, viz. Salem,  $5\frac{3}{1000}$ , Marblehead,  $5\frac{1}{1000}$  Newbury-Port,  $4\frac{8}{1000}$ : At Ipswich, containing four thousand five hundred and sixty two inhabitants (and which will be mentioned hereafter,) the proportion is,  $5\frac{6}{1000}$ . In this estimate for Massachusetts, the district of Maine is not included: but the state contains 373,324 inhabitants, exclusive of that district.—When the census is completed, for the several states in the Union, the result it will furnish, on this subject, will prove highly interesting—It appears, however, by the census for the large and populous state of Massachusetts, that the proportion of births to marriages, there, greatly exceeds that which obtains in some of the principal countries of Europe: And, it is probable, the result will be found nearly the same, in this particular, with relation to the major part of the Union.

There is, however, another means, by which the superior number of births in proportion to the whole number living, in this country,---compared with the proportion which obtains, in this respect, in prosperous European countries,—may be ascertained.—In an essay for ascertaining the population of France, by Messrs. Du Sejour, the Marquis De Condorcet and De La Place, (in the memoirs of the Royal Academy of sciences for 1783,) it is assumed as an hypothesis---that multiplying the medium of annual births in the whole kingdom, by  $25\frac{1}{2}$ , will give the number of inhabitants; and that, for the cities of Paris and Versailles, thirty must be the multiplier. The Count De Buffon supposes, that the number of those who die in France, annually, is  $\frac{1}{35}$  of all the living; and, consequently



quently, if the medium of annual deaths in the kingdom be multiplied by thirty five, the product will be the number of inhabitants it contains---Accordingly, by the first hypothesis, France should contain 24,812,877 inhabitants (taking the medium of births in that kingdom, exclusive of Corsica, in 1781 and 1782,---as stated in the memoirs of the Royal Academy of Sciences, for 1783):—And by the second hypothesis, the number would amount to 25,916,170, (taking the medium of deaths in nine years, viz. from 1754 to 1763,---as stated by the Abbè D'Expilly.) The variance in the result of these two hypotheses shews, that both cannot be just.—I am induced to believe that the second proportion approaches nearest the truth, for the following reason---Each marriage gives four and an half births, during the nine years estimated by the Abbè D'Expilly; whereas the same gives only the proportion of  $4\frac{2}{10}\frac{3}{10}$  births, for the years 1781, and 1782,—as stated by M. de la Place: and it may be presumed, that the longest term gives the truest proportion. If, therefore, the proportion of births to marriages from 1754 to 1763 (the last, included,) compared with the proportion of births to marriages, in 1781 and 1782, be admitted as a *Datum*, from which any probable estimate of the number of inhabitants in France may be deduced, for the latter period,—that number would be 26,396,667; which exceeds the highest number above stated. But  $4\frac{4}{10}$  births to a marriage—an intermediate ratio—will give the number of inhabitants the same, as thirty five of the whole number, living in a given term, to each death during the same time; and this accords with M. de Buffon's hypothesis.---Assuming, then, the truth of this position---there are in France  $26\frac{6}{10}\frac{3}{10}$  persons living, in proportion to each birth—Hence the number of annual births in that kingdom, multiplied by  $26\frac{6}{10}\frac{3}{10}$ , will yield the number of its inhabitants.---It appears, also, by an enumeration of the inhabitants of the  
kingdom



kingdom of Naples, taken in the year 1769,---that by multiplying, by twenty-five and an half, the births of a common year, in that kingdom, the product gave the real number of the inhabitants: and, further, that, on comparing the number of births and that of the inhabitants, in the city of Turin, in the years 1767 and 1768,---the proportion of the former was to the latter, as one to twenty-seven.---Considering these several circumstances, I would infer---that the proportion of about twenty-six and an half existing persons to each birth, is nearly right with reference to France. In this estimate for France, the Island of Corsica, subject to that crown, is not comprehended.---If there be one birth to every twenty-six and an half inhabitants, in that Island,---the latter must amount to 136,077; and, if this number be divided by the medium of annual deaths,---these will be to the whole number of the living, as one to  $32\frac{7}{10}$ . But, taking the medium of marriages and births, respectively, for Corsica, there were five births for one marriage. For this reason, a greater number ought not to be assumed, for ascertaining the actual population of that Island, than twenty-five persons to each birth. This reduces the total number of inhabitants to 128,375; and makes the number of those who die annually, compared with the whole number living, as one to  $30\frac{8}{10}$ : a degree of mortality, which indicates the unhealthiness of the climate; notwithstanding the high proportion of births to marriages, in that country, makes the number of deaths appear low, in comparison with the births.---

With respect to England---although Sir William Petty and other English writers agree in saying, that, in the *country* in that kingdom, there dies one in thirty-two,---M. Buffon estimates the proportion to be one in thirty-three. And Petty supposes that five are born, to four that die, in that country.---This ratio gives one birth to nearly twenty-

ty-six and an half inhabitants.---Dr. Price presumes, that 591,580, is nearly the true number of inhabitants, in London; but, that 651,580, though short of the number supposed in that city, is very probably greater, and cannot be less, than the true number.—In the first case, the number of inhabitants in London, divided by the annual number of deaths (including therein an addition of 6,000, for omissions,) gives  $21\frac{6}{100}$ , as the proportion out of which one dies annually:—and, in the second case, that proportion will be one out of  $23\frac{8}{100}$ . There are, notwithstanding, some circumstances, which dispose me to conclude, that London contains 711,516 souls---First; we find, by taking the medium of two estimates (one by Messrs. du Sejour, Condorcet and de la Place, and the other by M. Buffon,) that Paris contains about 626,285 souls, and that there are nearly thirty-two and an half living in that city, to each annual death.—We also find, that the mortality of London exceeds that of Paris, about one fourth part,—as estimated from the births and deaths for each city, respectively: consequently, the number of persons living, to each annual death, in London, will be twenty-six; agreeably to my hypothesis---Secondly; although Graunt, Petty, Morris, Smart, and other English authors, have adopted the number of thirty of the living, to each death, for London; yet the Count de Buffon supposes---that thirty-one to one, is near the truth: and Dr. Price states the proportion to be twenty-one to one:---The medium, therefore, of M. Buffon's and Dr. Price's estimates is twenty-six to one. Now, if we assume the proportion of one birth to twenty-six inhabitants, annually, for France, which is less favorable, with respect to the ratio of births to inhabitants in that kingdom, than the estimate of M. du Sejour, &c.---and, if it be assumed as a fact, that one in twenty-six dies, annually, in London; the proportions of the births in a year, for the several places herein mentioned,

ed, are, to the number of souls in those places, respectively, as follow, viz.

In France——1 birth——to 26 inhabitants

England——1 do.——to  $26\frac{1}{2}$  do.

Paris——1 do.——to 30 do.

London——1 do.——to  $32\frac{1}{2}$  do.

Yet, even in the city of Philadelphia, the annual births amount to one in twenty-two and an half, of all the inhabitants. A bare inspection of the several proportions, in this particular, will enable one to form a judgment of the increase of population in this country, beyond that of the two most considerable in Europe.

Another circumstance, from which the extraordinary progress of population, in this country, may be inferred, is the high proportion of those under the age of 16 years, to those above that age, out of the whole number of the living.—Dr. Halley computes the number of the living, under 16, to be but a *third* of all the living at all ages. But it appears from the census of the inhabitants of New-Jersey, taken by order of the government at two periods, viz. 1738 and 1745, that, in the year 1738, the number of those *under* 16, was to the whole amount, as  $47\frac{6}{100}$  to 100; and, in 1745, the proportion was, as  $49\frac{5}{100}$  to 100. The proportion of free white males, to the whole number of persons of that description, in Massachusetts, taken from the recent census of inhabitants in that state, is as  $48\frac{2}{100}$  to 100.—Hence we find nearly\* *one-half*, instead of one-third, is the proportion, here, of those under 16, out of the total number of our inhabitants.—The proportion for the city and suburbs of† Philadelphia, is,

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\* Mr. Jefferson observes—in his notes on Virginia—that, to find the number of free inhabitants in that state, it is to be noted—that those above and those below 16 years of age, are nearly equal.

† The celebrated founder of Pennsylvania, in a letter to his friends in London (dated at Philadelphia, the 16th of August, 1683)—acquaints them, that the planted parts of the province were then erected into six counties, containing about four thousand souls; and that the *capital* had advanced, within less than a year, to about four score houses and cottages, such as they were.—Philadelphia *now* contains about 44,000 inhabitants!

by the census,\*  $41\frac{3}{100}$  to 100: but this inferiority of the proportion of persons under 16 to those above that age, in Philadelphia, may be attributed to a greater proportion of children dying in large cities, than in country places. The next circumstance, from which I shall infer that the progress of population is much more rapid in this country, than elsewhere, is, that the births exceed the deaths, in number, in a superior degree, among us.—The Abbé D'Expilly, in his estimate before mentioned, gives the births to the deaths, in France, as 100 births to  $76\frac{1}{2}$  deaths. In the Pais de Vaud, on an average of ten years, the proportion was, to 100 births,  $79\frac{3}{4}$  deaths.—In great cities, the degree of mortality is much higher. By the tables of births and deaths in Paris, for twenty-two years (viz. from 1745 to 1766,) the births and deaths give the proportion of 100 of the former, to  $99\frac{1}{2}$ . The medium of four other statements (two by M. de la Place, one by Dr. Price, and the other taken from Anderson's historical and chronological deduction of the origin of commerce,) gives, for Paris, 100 births to  $100\frac{1}{2}$  deaths: and the Count de Buffon says, that, in fifty-eight years, the deaths in Paris exceeded the births only about  $\frac{1}{75}$  part. This is a favorable proportion for so great a city.—Mr. Anderson has given the numbers of annual births and deaths in London, during a term of twenty-six years; from which it is found, that the deaths exceed the births, in that city, at the rate of five to four, very nearly. This statement, which gives the proportion of births, in London, rather higher than others, shews, that the mortality of that city is about one-fourth greater, than that of Paris. At Amsterdam and Berlin, according to Dr. Price, the degree of mortality is still higher than in London; there being, in the former, to 100 births  $169\frac{5}{6}$  deaths, and in the latter, to 100 births 131 deaths. In the city of Norwich, Great-Britain, on a medium of thirty years, there

\* Since the census has been completed, the proportion appears to be 42.5-100 or 100.



there were, to 100 births,  $114\frac{4}{10}$  deaths—That city is supposed to contain about 33,000 inhabitants. And at Breslaw, which contains about as many inhabitants as Philadelphia, the births are to the deaths (taking the medium of two statements) as 100 births to  $119\frac{1}{2}$  deaths. The proportions of births to deaths vary, in different countries; and, in large towns, the proportion of the latter is always higher than in country places, *cæteris paribus*. But, taking the principal countries of Europe, *engros*, the births do not exceed the deaths in any great degree—I have subjoined a scale of these proportions, for several cities and countries, not enumerated in the foregoing statements.

The births (estimated from the *christenings*) in Philadelphia, in the year 1788, were 1583; and the burials, exclusive of negroes, amounted to 872. The number of negro births for this city, as appears by the bills for the years 1789 and 1790, average 144 *per annum*. Supposing one-third of this number to be included in the *christenings*, forty-eight must be deducted from the list of births: This will give 1536 births, to 872 deaths, for the year 1788:—and, taking the average proportion of births to deaths, for four years, it gives to 100 births,  $56\frac{1}{2}$  deaths. The average number of deaths, among *all* the *white* inhabitants of this city, for the three last years, is 924 *per annum*. The proportion of births to deaths, in the German Lutheran congregation of this city, which comprehends about one-fifth of all the white inhabitants, is, on an average of\* sixteen years, as one hundred births to forty-five deaths: and therefore, taking the medium of this proportion and that above stated, it gives to 100 births;  $50\frac{1}{4}$  deaths. The bills, for the white inhabitants in this city, for 1789 and 1790, give the proportion as only 100 births to  $49\frac{9}{10}$  deaths; and, as these bills are the most full

\* The Rev. Dr. Helmuth, rector of the German Lutheran church, in Philadelphia, was so obliging as to furnish me with these lists.



full and satisfactory of any I have yet seen, for Philadelphia, I think the births may be fairly stated as being double to the number of deaths.—At Salem in Massachusetts, on a medium of the years 1782 and 1783, the births were to the deaths, as 100 births to 49 deaths, including the still-born in the number of deaths.—Dr. Holyoke says (in the memoirs of the American Academy of Arts and Sciences, Boston,) that both 1782 and 1783 were sickly at Salem ;—particularly the latter years, in which, during the months of May and June, the measles were epidemic. The births and deaths at Hingham, in the same state, during 54 years, gives to 100 births  $49\frac{1}{2}$  deaths.—Hence it may be inferred, that, so far as deductions from these documents may be relied on, there are two births to one death, in this country.

The peculiar circumstances of this new country will not permit me to ascertain, from the *data* usually employed for such purposes, the comparative longevity of our inhabitants.—Agreeably to Dr. Halley's table for Breslaw,\* 34 persons, out of 1000, survive 80 years of age. In the paper on the longevity of the inhabitants of Ipswich and Hingham, in Massachusetts (communicated to the Boston Academy, by the Rev. professor Wigglesworth,) the writer observes, that, out of 164 persons who died at Ipswich Hamlet, in ten years, twenty-one persons survived eighty years complete; being one in about eight: whereas, at Breslaw, the proportion is one in about thirty—He also states, that, out of 1,113 deaths in 54 years, at Hingham, 84 persons survived 80 years complete; being one in  $13\frac{1}{4}$ . It is observed by Mr. Morse, in his American Geography, that the state of Connecticut, though subject to the extremes of heat and cold, in their seasons, and to frequent, sudden changes, is very healthful. He says, that as many as one in

\* This does not, however, by any means, correspond with M. Buffon's estimate; as he makes the proportion to be only 27.63-100 out of 1000.---

46 of the inhabitants of Connecticut, who were living in 1774, were *upwards* of seventy years old: and that it is found, from actual calculations, that about one in eight live to the age of seventy years; one in thirteen, to the age of eighty; and one in about thirty, to the age of ninety years.—“From the 1st January 1771, to the 1st January 1777,---239 persons died at Milford, (Connecticut;) of which thirty-three, or about one seventh part, were upwards of seventy years old---and eighty four. From Jan. 1st 1771, to June 3d 1782, died at Milford, 417 persons; of which, thirty-one (or about one thirteenth part of the whole number) were eighty years old, and upwards. Other calculations of a similar kind, continues Mr. Morfe, made in different parts of the same state, from the bills of mortality, confirm the justness of the above proportion.”--The number dying in Philadelphia, aged upwards of eighty years, during the year 1789, is in the proportion of about twenty-four and an half out of 1000 persons. Those dying after that age, and upwards to the age of 101 inclusive, must have been born between 1688 and the end of 1709. During this term of twenty-one years (commencing about six years after the first settlement of Europeans, on this spot,) it is not probable that more than 1000 children were *born* here; and, even admitting that *all* of these died here, the proportion of *such* could not, agreeably to Dr. Halley’s estimate, exceed thirty-four, during the year 1789. But it is probable, that many of those who were born here, during the above mentioned term of twenty-one years, had removed from the city, prior to the year 1789; and it is also probable, that *some* of those who died at Philadelphia in that year, aged upwards of eighty, were not natives of this city—It may, therefore, be presumed, that the *changes* of an addition to the number of those dying after eighty, which have been lost by the removal of natives before that age, may be *balanced* by the  
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the same number of non-natives, who died here after eighty, in the course of that year. In this case, the number of those who die at Philadelphia, after completing the 80th year of their age, compared with the total number of deaths in the year 1789, will stand in the proportion of  $24\frac{1}{2}$  of the former, to 1000 of the latter. It must be obvious, to any person considering this subject, that every calculation of the probabilities of the duration of life, at the *later* periods of life, and of the proportions, which the numbers of those dying at very advanced periods of its existence, bear to the numbers of such as die, at its early and middle ages,—must necessarily give a more unsatisfactory result, than similar estimates for the anterior periods of life.—This is the case, in some degree, when applied to any country; under whatever circumstances the application may be made: the observation is true, in a greater degree, when applied to towns, whether great or small:—and it is still more just, with respect to *American* towns; by reason of the infant state of our country,—the continual fluctuation in the migrations of the inhabitants,—and the rapid increase of population, as well in our capitals as in the country generally.—The reason of my not having gone higher than the age of 101 years complete, is, that M. Buffon, in his general table of the probabilities, &c. makes no calculation for any age beyond that period of life: out of 23,994 deaths, he estimates only two to be living after the completion of the 101st year, and *none* at 102.

A further *datum* for ascertaining the superiority of this country, in the progress of its population, is founded on the proportion which the annual deaths bear to the whole number of the living, in different countries.—In Dr. Price's essay on the expectation of lives, state of London, population, &c. it is laid down, as the result of various calculations, that in London and Edinburgh, there die annually about one in twenty-one; in Dublin, one in twenty

ty-two; in Rome, one in twenty-three; in Amsterdam, one in twenty-four, &c. M. Sufmilch makes the proportion of those who die, annually, in *great* towns, to be from  $\frac{1}{24}$  to  $\frac{1}{28}$ ; in *moderate* towns, from  $\frac{1}{28}$  to  $\frac{1}{34}$ ; and, in the *country*, from  $\frac{1}{40}$  to  $\frac{1}{50}$ . But Dr. Price supposes the following proportions more just, viz. Great towns, from  $\frac{1}{40}$  or  $\frac{1}{50}$ , to  $\frac{1}{23}$  or  $\frac{1}{24}$ ; moderate towns, from  $\frac{1}{23}$  to  $\frac{1}{28}$ ; and the country, from  $\frac{1}{30}$  or  $\frac{1}{33}$ , to  $\frac{1}{30}$  or  $\frac{1}{40}$ : and he is of opinion, with M. Sufmilch “that, taking a whole country in gross, including all cities and villages, mankind enjoy among them about thirty-two or thirty-three years, each, of existence; or,—which amounts to the same thing,—that one out of thirty-two or thirty-three dies annually.—Sir William Petty, in his essays on political arithmetic, says—that in the *country*, in England, one dies out of thirty-two; and, that five are born to four that die. “This last fact, ‘says M. Buffon,’ agrees pretty well with what happens in France: but if the first fact be true, it follows, that the salubrity of the air in France is much greater than in England,—in the proportion of thirty-five to thirty-two;—for, it is certain, that, in the *country* in France, no more than one dies out of thirty-five.”—M. Sufmilch makes the proportion, as deduced from 1098 country parishes in Germany, to be one out of forty-three. He likewise gives the proportion of one to forty-five for a country parish in Brandenburg: and M. Muret establishes the same, for the Pais de Vaud,—(See Dr. Price’s observations, &c.) The two last are the highest proportions I find for any part of Europe. In Madeira,—(an African Island) Dr. Heberden states the proportion to be one in fifty;—the climate of that Island, it is true, is remarkably salubrious: but Dr. Price thinks the estimate of Dr. Heberden is exceptionable. Large towns give the proportions dying out of the whole number, much higher;—even at Breslaw—which has, in this kind of calculations, been stiled *the*

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*British standard of life*,—the proportion is stated as being one to twenty-eight.—It appears, however, by the number of inhabitants in Philadelphia and Salem, that in the former—a town about as populous as Breslaw—the proportion is one to forty-five; and in Salem, one to forty-seven.

There is no circumstance that affords a more striking proof of the rapid progression of population in this country, than the prodigious increase in the numbers of our people, since the original settlements of Europeans on these shores. The first settlement made by Europeans, within the present limits of the United States, was in Virginia, by a colony consisting of about one hundred English, in the year 1607. The honorable Mr. Jefferson (in his notes on Virginia) remarks, that, about the year 1654, the progression in the population of that state became pretty uniform; importations having in a great measure ceased, and the inhabitants become too numerous to be sensibly affected by Indian wars. Beginning, at that period, therefore, says this gentleman, we find,—“that from thence to the year 1772, our tythes had increased from 7,029, to 153,000.”—The whole term being of 118 years, yields a duplication once in every  $27\frac{1}{4}$  years. The intermediate enumerations, taken in 1700, 1748 and 1759, furnish proofs of the uniformity of this progression.”—A very inconsiderable colony of English formed a settlement at Plymouth, in New-England, in 1620. In 1643, 21,200 persons, also emigrants from Britain, settled in New-England: and, since that period, it is supposed more have emigrated from thence, than the numbers who had gone thither would amount to.\* In the year 1760, they were increased half a million.—Therefore, as Dr. Price observes, they have all along doubled their own number, in twenty-five years. Two years since, Mr. Morse estimated the number of people in New-England, at 823,000.

Our

\* See a discourse on Christian union, by Dr. Stiles—Boston, 1761.



Our late President, the illustrious Franklin, was of opinion, that the people of these states double their number in twenty years.\* Dr. Price seems to think---that, "in the back settlements, where the inhabitants apply themselves entirely to agriculture, and luxury is not known, they double their own numbers in fifteen years; and all through the Northern colonies, in twenty-five years;----which, continues Dr. Price, is an instance of increase so rapid, as to have scarcely any parallel."---Even in Madeira---where, according to Dr. Heberden, only  $\frac{1}{30}$  part of all the inhabitants die annually,---it is said they do not double their number in less than eighty-four years.

To assist us in forming a satisfactory judgment, respecting the probabilities of the duration of life, in this country---a consideration intimately connected, in the present enquiry, with the causes of the quick progress of its population,---it becomes necessary to examine into the ‡ longevity of the inhabitants.---Having noticed, in the preceding part of these observations, that nearly one half of the people, in the Northern and middle states of the union, are under sixteen years of age---although Dr. Halley states, that, in Europe, the proportion of such is only one-third----the inference, necessarily resulting from these facts, is,---either, that the probability of the continuance of life is greater here than in Europe, between the birth and sixteen years of age, out of equal numbers born; or, if the probabilities are equal, prior to that period of life, in the two countries respectively---that the proportion of births to the number of inhabitants, here, exceeds that in Europe;---or, on the other hand, that the probabilities of life are lower in this country, subsequent to that period.

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From

\* Observations concerning the increase of mankind, peopling of countries, &c.

‡ "Those inhabitants of Pennsylvania, who have acquired the arts of conforming to the changes of our weather, in dress, diet, and manners, escape most of these acute diseases, which are occasioned by the sensible qualities of the air: and faithful enquiries and observations have proved, that they attain to as great ages, as the same number of people in any part of the world."---Dr. Rush's account of the climate of Pennsylvania, &c.

From circumstances which have been already stated, it is evident the proportion of births, to the existing number of the whole people, is greater here than in Europe: but it is not probable that this excess is greater than in the proportion of one-half to one-third---I presume it is rather less.---If, however, this excess be in the ratio of three to two, the chances of life from the birth to sixteen will, in this case, be the same in both countries. On this supposition, then, the probabilities in favor of the continuance of life *after* sixteen, through all the subsequent stages of its possible existence, must be higher here than in Europe: because, as I have shewn, only one in forty-five die annually, even in the city of Philadelphia; whereas, in France, the proportion is one in thirty-five, and in England, one in thirty-three.

In addition to what has been said, respecting the longevity of the inhabitants of Connecticut, and of Hingham and Ipswich-Hamlet in Massachusetts, I shall mention a few remarkable instances of longevity, which have occurred in other parts of the union--They are not adduced as being, of themselves, proofs of American longevity; but rather to evidence its reality, in such cases as serve to corroborate the truth of the position, that the people of this country are long-lived.---The instances are the following.---In the year 1765, a Mr. Temple died in the county of Worcester, Massachusetts, aged eighty-six years--He left eight children, four sons and four daughters, all of whom were living in September 1788; and their ages were as follow, viz. 89, 85, 83, 81, 79, 77, 75, and 73. John Sydenham (commonly called Sidman) was living near Mount Holly, in the state of New-Jersey, on the 5th of November 1788: he was then 106 years and three months old--This man was born near Exeter, in England; but was brought to ~~America~~ *America, when only eighteen months of age. Edward Trin-*  
*cker was born in Philadelphia, December 21<sup>st</sup>, 1690,*  
*and*

and died November 17th, 1782.—Mr. Hooton, a native of the city of New-York, was living last summer (and I believe is still alive,) in the district of Southwark; aged, at that time, upwards of 107 years.—In the bill of mortality for Christ church and St. Peter's, in this city, in the year 1775, I observe the death of one person, aged 120 years. The Pennsylvania Mercury of the 1st of March, 1788, has, republished from a Wilmington paper under the date of February 27th, the names of fifty persons then living, in Anamessex and Pocomoke Hundreds, Somerset county, in the state of Maryland,—all of great ages: of these, twenty-three were upwards of ninety years of age; sixteen, upwards of eighty-seven; and eleven, aged eighty-five.—In the year 1775, Mrs. Lear died at Portsmouth, New-Hampshire, at the age of 103 years. In the same year, Mrs. Abigail Mayo died at Cambridge, Massachusetts, aged 106 years. And Mr. William Ward, a native of Fairfield, in Connecticut, died in the state of New-York, also in the year 1775, aged 105 years, four months and twenty days.

On the 20th of Sept. 1788, died at his seat in Albemarle county, Virg. Daniel Maupin, who was born on the 25th of March, 1700. At the time of his death, there were living, of his offspring, upwards of 200 persons, including some of the fifth generation. His wife was then alive and in good health; and it was not known that any female of her generation, after attaining to the years of a woman, died under the age of eighty-five years.---About three years since, Arthur Bibbington died at Wyndham in Connecticut, aged 107 years:---And, about the same time Mrs. Jane Brasler died in the city of New-York, at the age of a 102 years.---Timothy Matlack, Esq. clerk of the Senate of Pennsylvania, has favored me with a communication of the following facts, transcribed from a note made by him, about twenty-four years since—Upon reading a paragraph

paragraph in a Philadelphia paper, republished from an *English* paper, mentioning that five brothers, the sons of one mother, had met, whose ages, added together, amounted to 311 years,—his mother (a widow) observed, that she had five brothers and sisters, then living—the children of one man and one woman, whose ages, added to her own amounted to upwards of 400 years—He also mentions, that there were then living, of the brothers and sisters of his father, six persons—the children of one man and one woman,—whose ages added together amounted to 426 years; all of whom were born in west New-Jersey---At the same time, his wife observed, that her father had six brothers and sisters---the children of one man and one woman,---all born in Pennsylvania and then living,--whose ages added together, including his own, amounts to 470. To these circumstances, his mother added, that she and her two sisters had borne thirty-seven children; of whom thirty were then living,---and the youngest of them, seventeen years old. Hence it appears, that the mean age of these *nineteen persons*---who may be considered as of *one family*---exceeded sixty-eight years. Mr. Matlack adds, that he is not certain whether any of his father's brothers be now living; although some of them were alive, within a few years past: But, that the last of his mother's sisters died four years since, and the last of his wife's uncles died within a few months past.\*

But

*Additional Instances of Longevity, in America.*

\* On the 4th of February, 1787, died in Pennsylvania, in the 103d year of his age, Jacob Wismer, a native of Germany. In Queen Anne's reign, he emigrated to N. Carolina, where he lived ten years; after which he settled in Bucks county in Pennsylvania, where he married his third wife, with whom he had 170 children, grand-children and great grand-children; and left his widow, about 84 years old.—He must have resided in America, *at least* 72 years.

Zachariah, regent of the Mohegan tribe of Indians, died in his Wigwam, in Pomfchang near Norwich, in Connecticut, in the 100 year of his age—in the year 1787.

Mrs. Hannah Flagg, died at Boston, at the age of 102 years—in the year 1787.

Dr. Bernard Vanlear died in Delaware county, Pennsylvania, in the 104th year of his age—in the year 1790.

At Exeter in New-Hampshire, in 1790, Mr. Thomas Hayley,—aged 101 years.

At Southborough in Massachusetts, in 1790, Mrs. Newton,—aged 106 years—Her mother lived 113 years, and her sister 102 years. At



But numerous and remarkable instances of American longevity are, by no means, confined to the Northern and middle states. On the authority of two gentlemen of respectability and observation, one from Virginia—and the ‡ other from North-Carolina,---I am warranted in saying, such instances occur in those states, as induce a belief, that their climates are favorable to a long duration of human

At Thomson in Connecticut, in 1790, Mr. Henry Elthorp—aged 105 years.

At Albany, in the state of New-York, in 1790, Mr. Abraham Vanverts,—aged 124 years.

At East-Haddon, in Massachusetts, in 1790, Mr. Weeks Williams,—aged 100 years.

At Windham in Connecticut, in 1788, Mr. Arthur Ribbins—aged 110 years and ten months.

At Chesterfield in Virginia, in 1788, Daniel Nunnally—aged 105 years.

At Wilmington in the state of Delaware, in 1789, Mr. Christopher Hendrickson,—aged upwards of 100 years---He was one of the first Swedish settlers on the Delaware.

At Northampton in Massachusetts, in 1788, Mr. Josiah Clark—aged 92 years. He was the youngest of 11 children (six sons and five daughters,) three of whom lived to be above 90, four above 80, and three above 70 years of age. From the six sons, only, have descended 115½ children, grand-children and great-grand children; 925 whom are now living.

At Dover in New-Hampshire, Mrs. Margant Wight, in 1787—aged 102 years.

In Berks county, Pennsylvania, in 1789, Joseph Mountz,—aged 100 years.

At New-London, Connecticut, in 1789, Mrs. Dowsett,—aged 102 years.

In the city of New-York, in 1789, Mrs. Elizabeth Lynch,—aged 104 years.

At Great Barrington, in Massachusetts, in 1789, Mrs. Chapman,—aged 101 years.

In South-Carolina, not long since, Mrs. Dedcot,—aged upwards of 100 years; Mrs. Maffey, aged 102; and Mrs. Maffey's nurse, aged 115 years.

I am indebted to Jonathan Williams, jun. Esq. one of the Secretaries of the A. P. S. for the following instances of American Longevity, which he was so obliging as to transmit to me, from Richmond in Virginia, in June last ---viz.

Abraham Eades, now living in Albemarle county Virginia, is 110 years old.---His wife died at 100, and they were married 80 years.

A man of the name of Ice, Monongalia county Virginia, is now living---106 years old.

A Mr. Crafton, King and Queen county Virginia, is 104 years old, now living.

John Dance, of Chesterfield county Virginia died at 125 years old. He began to cut teeth before his death.

‡ Dr. Williamson. This Gentlman has given me permission to make use of the following letter, on this occasion.

S I R,

It is not possible to give a general rule which shall apply to the several parts of North-Carolina, in answer to your questions concerning the duration of human life in that state. In the eastern part of the state, within fifty or sixty miles of the sea, where the country is flat and there are many marshes, the inhabitants are much afflicted during the summer and autumn by intermitting and other bilious fevers. During the winter, as the cold is seldom intense and by no means constant or certain, the inhabitants in general are not sufficiently careful to defend themselves against the cold: hence many, in the vigor of life, men especially, are cut off in a few days by pleuritic or other inflammatory fevers. Such is the state of the fluids in those who have been reduced by intermittents during the autumn, that they seldom resist inflammatory fevers. Time and observation will doubtless teach the inhabitants, by keeping themselves dry and warm, to prevent what they cannot readily cure. There are instances nevertheless of a considerable degree of old age, in that very climate. In the western parts of North-Carolina, towards the mountain, the inhabitants enjoy a great degree of health. Many of them have very numerous families and attain to old age. As that country was long the residence of a maternal ancestor, I have probably been more attentive to the progress of population there.

man life. The same may be observed, with respect to † South-Carolina and Georgia, in which states the climate is salubrious; although low, flat parts of the country, and such as lie in the vicinity of the rice and indigo swamps, as well as the bad quality of the water in such situations, render some parts of those countries unhealthy.—Even in East-Florida (if Captain Bernard Romans is to be credited), the climate is very healthful—St. Augustine, the capital

We have some reason for believing, that on the west side of the Apalachian mountain, in the territory ceded by North-Carolina, the period of human life may be extended to what would be called a great length in any part of the world.

In that country, there are few marshes or ponds of stagnant water. The soil is dry, and lime stone abounds every where: the water is consequently very good.

In or near the latitude of 36 degrees, we are neither to expect the extremes of heat nor cold; but we have noted causes in this very latitude, which are very injurious to health: these causes however do not exist in the country of which I am speaking. The Apalachian mountain effectually protects the inhabitants from the moist and cold easterly winds with which we are afflicted in the Atlantic states; and the North-West wind, in such a latitude, at such a distance from the ocean and on the west side of those great mountains, has little of that piercing quality by which it is distinguished in this part of the world. From the circumstances mentioned you would infer, and experience supports the inference, that the inhabitants of that country are neither afflicted with intermitting fevers, inflammatory fevers, consumptions, nor other diseases, which are usually induced by heat and moisture or by a sudden check to the perspiration. As no part of that country has been settled much more than twenty years, we are not to expect many instances of extreme old age, among the inhabitants; but appearances are in favour of long life. In the year 1789, Jonathan Tipton died, in Washington County near Halfston River, aged 105 years: he had lived there 20 years. Benjamin Cobb, Val. Sevier, and others, have been mentioned to me, as persons now living in that country, above 90 years old, who enjoy perfect health; and ride about, as usual, in pursuit of business or amusement.

I am Sir,

With the utmost respect

Your obedient Servant,

Philadelphia, 17th March, 1791.

HU. WILLIAMSON,

† The author of a work, entitled—"An historical account of the rise and progress of the Colonies of South-Carolina and Georgia" (printed in London, in 1779,) observes, that in South-Carolina, in the months of July, August and September, the heat in the shaded air, from noon to three o'clock, is often between 90° and 100°: but, that such extreme heat is of short duration. He says, he has seen the mercury, in Fahrenheit's Thermometer, rise in the shade to 96° in the hottest, and fall to 16° in the coolest season of the year; and that others have observed it as high as 100° and as low as 10°—He observes that the mean diurnal heat of the different seasons, in South-Carolina, has been, upon the most careful observation, fixed at 64° in spring, 79° in summer, 72° in autumn, and 52° in winter; and the mean nocturnal heat, in those seasons, at 56° in spring, 75° in summer, 68° in autumn, and 46° in winter: The mean temperature of the air is, therefore, in South-Carolina, (at least, in the level and maritime parts of the state) 64°, which is 11°½ less than what Dr. Rush mentions to be the standard temperature of the air, in the city of Philadelphia, viz. 52°½—"It has been observed (says the author of the history of Carolina, &c.) that, in proportion as the lands have been cleared and improved, and scope given for a more free circulation of air, the climate has likewise become

more

capital of that province, is, in his opinion, as healthy a spot as any on the continent. He asserts, that the Spanish inhabitants lived here to a great age; and that the people of the Havanna considered it as their Montpelier, frequenting it for the sake of health.---According to Captain Romans, the climate of West-Florida agrees, in every respect, with that in the Northern division of East-Florida; excepting that the winters are somewhat more severe, in the former---He says there were such instances of longevity in West-Florida, as were not to be outdone in any part of America. Yet circumstances, similar to those which render particular *situations*, in some of our Southern states, unfavorable to health,---produce similar effects in some parts of these two provinces; though in a greater degree. Clavigero (in his history of Mexico) asserts that Calmecahua, one of the Tlascalcan captains who assisted

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more salubrious and pleasant. This change was more remarkable in the heart of the country, than in the *maritime* parts, where the best plantations of rice are, and *where water is carefully preserved to overflow the fields*: yet even in *those* places, cultivation has been attended with salutary effects---time and experience had now taught the planters, that, during the autumnal months, their living among the low rice plantations subjected them to many disorders, from which the inhabitants of the *capital* were *entirely exempt*:---This induced the richer part to retreat to *Town*, during this unhealthy season. Governor Ellis has mentioned that, on the 7th of July, while he was writing in his piazza, in Savanna, the Mercury stood at  $102^{\circ}$  in the shade; that it had twice risen to that height, during the summer, several times to  $100^{\circ}$  and, for many days together, to  $98^{\circ}$ ; and in the night, it did not sink below  $89^{\circ}$ . He had the same thermometer with him, in the equatorial parts of Africa, in Jamaica, and in the Leeward islands: yet it appears, that he never found it so high in those places;---its general station was between  $79^{\circ}$  and  $86^{\circ}$ . He acknowledges, however, that he felt those degrees of heat, in a *moist* air, *more disagreeable than at Savanna*, when the thermometer stood at  $84^{\circ}$  in his cellar, at  $102^{\circ}$  in the story above it, and in the upper story of his house, at  $105^{\circ}$ .---And he asserts, that few people died at Savanna, out of the ordinary course; though many were working in the open air, exposed to the sun during this extreme heat, (See notes to the tables, N<sup>o</sup>. II.) The town of Savanna being situated on a sandy eminence, greatly increases the heat of that spot: But the climate of Georgia, in general, like that of South-Carolina, is more mild and temperate in the inland, than in the maritime parts. And the late Dr. Moultrie,---who resided, and practised physic with great reputation, in South-Carolina, fifty years---was of opinion, that Charleston is as healthy a spot, as any upon earth.---A writer, in a late Charleston paper---who subscribes the signature H. L. and dates from St. Johns, Berkeley, (supposed to be Henry Laurens, Esq.) says he has frequently heard Dr. Moultrie declare that opinion: and this writer gives the names of fifteen persons, who had died in South-Carolina, within a short time past, whose ages average  $83\frac{1}{2}$  each:---three of the fifteen averaged  $105\frac{1}{2}$  years, each. He mentions, also, that a great number of other instances might be adduced, of persons who within his own memory, lived to the like great ages;---several, upwards of 100 years.

On the whole, it is evident---that, in South-Carolina and Georgia, the flat, marshy parts of the country, and the artificial swamps which the culture of Rice and Indigo render necessary,---are, only, unhealthy: but that high, airy and dry situations, in those states, experience no such effect; from the *beat* of the climate.

the Spaniards, in the conquest of Mexico, lived 130 years. He also makes mention of a Jesuit, who died in that country at the age of 132; and of a Franciscan, who died in Sombrerete, aged 117, making preachings to the people, until the last month of his life. "We could (says this author) make a long catalogue of those, who, in the two centuries past, have exceeded one hundred years of life, in these countries:---*particularly among the Indians*, there are not a few, who reach 90 and 100 years; preserving, to old age, their hair black, their teeth firm, and their countenance fresh."—Don Ulloa (in his *Noticias Americanas*) says, that, in general, the American Indians live to a great age.---This longevity, attended in general with uninterrupted health, is thought, by some writers, to be the consequence in part of their vacancy from serious thought and employment, joined also with the robust texture and conformation of their bodily organs. If, continues this writer, the Indians did not destroy one another, in their almost perpetual wars-- and if their habits of intoxication were not so universal and incurable, they would be, of all the races of men who inhabit the globe, the most likely to extend, not only the bounds, but the enjoyments of animal life, to their utmost duration.

In the course of these observations, I have endeavoured to shew---and, I flatter myself, not altogether without success,---that the probabilities of life, *in all its stages*, from its commencement to the utmost possible verge of its duration, are higher in these United States, than in such European countries, as are esteemed the most favorable to life. And, if this position be well founded, it follows---that the bodily constitutions of the American people are proportionably *healthful*. For, although it may be deemed problematical by some, whether an extraordinary degree of vigor, in the system of the human body, affords a greater probability of attaining to extreme old age, than, *cæteris paribus*



*paribus*, is annexed to a more delicate frame;---yet it will not admit of a doubt, that a great portion of vital energy and strength must necessarily exist, where the probabilities of life are high throughout all its periods---from the birth, until the usual term of its duration be compleated.

The climate of much the greater portion of the United States furnishes great degrees of\* heat and cold, in their respective seasons; but neither of the extremes is of long continuance. Our climate is also very † variable, the temperature of the atmosphere being liable to great and sudden vicissitudes. Nevertheless, taking the whole routine of the seasons, we enjoy a large proportion of fine and moderate weather; with more days of ‡ sun-shine and serene sky, than, perhaps, any part of Europe exhibits. A very considerable part of\* France experiences greater

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extremes

\* Dr. Rush has noticed---in his account of the climate of Pennsylvania---that "the greatest degree of heat upon record, in *Philadelphia*, is  $95^{\circ}$ :" but the observations made at Spring-mill (13 miles from Philadelphia, in lat.  $40^{\circ}$ .  $9'$ .) shew---that the Mercury rose to  $96^{\circ}$ , at *that place*, on the 3d of July, 1787; yet the mean degree of heat, during that day, was only  $85^{\circ}$  8-10.---See *Columbian Mag.* for August 1787.

† Dr. Rush---in his account of the climate of Pennsylvania---has cited the authority of Dr. Huxam, to shew---that the healthiest seasons in Great-Britain have often been accompanied by the most variable weather. And Dr. T. Bond---in his oration before the Philosophical Society, in 1782---remarks, that "we live in a healthy, though the most variable and active climate, in the universe"---"History (he observes, further) and the first settlers of this country agree, that the native Indians of North-America were found, by the Europeans, to be a stout, hardy, brave, virtuous, healthy, and remarkably long-lived people." After other observations on this subject, the Doctor continues thus---"I am sensible this opinion, of the advantages resulting from a changeable atmosphere, is counter to the common notions of mankind:---it is nevertheless true, and adopted by the best writers;---and not only confirmed by meteorological and morbid registers, and the general laws of creation; but will further stand the test of historical enquiry."

‡ "The month of May, 1786, will long be remembered, for having furnished a very uncommon instance of the absence of the sun for fourteen days, and of constant damp or rainy weather."---Dr. Rush's account of, &c.

\* Mr. Jefferson (in his notes on Virginia) makes mention, that, "at Williamsburg, in August 1766, the mercury in Fahrenheit's thermometer was at  $98^{\circ}$  corresponding with  $29\frac{1}{2}$  of Reaumur---At the same place, in January 1780, it was at  $6^{\circ}$  corresponding with  $11\frac{1}{2}$  below 0, of Reaumur. At Paris, in 1753, the mercury in Reaumur's thermometer was at  $30\frac{1}{2}$  above 0; and, in 1776, it was at 16 below 0:---the extremities of heat and cold, therefore, at Paris, are greater than at Williamsburg, which is the hottest part of Virginia."---Captain Romans says---that, in East-Florida, on some sultry-hot days in July and August, he has known the mercury rise to  $94^{\circ}$  of Fahrenheit's scale: but that, during the summer, the general height of the mercury was between  $84^{\circ}$ , and  $88^{\circ}$ , when the thermometer was placed in the shade, accessible to a free circulation of the air.--At the Norriton observatory (in lat.  $40^{\circ}$ .  $9'$ .  $31''$ , and about twenty miles Westward from Philadelphia,) the mercury in Fahrenheit's thermometer---not exposed to the sun shine, but open to the air---was at  $94\frac{1}{2}$ , on the 5th of July, 1769; which was the greatest height it had ever been observed to rise to, at that place.

(from

extremes of heat and cold, than the United States in general: yet we find that country to be more favorable to fecundity and life, than England, where the summers and winters are † less intemperate. And in the Swiss Cantons and Sweden, where the frequent and sudden changes, in the temperature of the atmosphere, are very similar to the vicissitudes which prevail in our own climate,—the natives are a hardy, vigorous and healthful people. According to M. Catteau, in his general view of Sweden, the winters in that country are long, dry and extremely cold; the summers short, and exceedingly hot; and the inhabitants experience a rapid change from the former of these seasons to the latter, spring and autumn being almost unknown to them. The pure and sharp air which the Swedes breathe (this writer further observes,) renders them vigorous, and preserves them from epidemical diseases: and he refers to a memoir published by M. Wargentin, to shew, that there are numerous instances of their attaining to a very great age. The

(From a letter dated July 26, 1769, from Mr. Rittenhouse, to the late Rev. Mr. Barton—*penes* W. Barton.)—Dr. Rush, in his account of the climate of Pennsylvania, observes—that the mercury in Fahrenheit's thermometer stood at 95°. on the 15th of August 1779, at Philadelphia, (which is the highest degree to which it has ever been known to rise in this city;) and that it fluctuated between 93°. and 80°. for many weeks. The Doctor says it stood, for several hours, at 5°. below 0, in January 1780, at Philadelphia; and, during the whole of that month, excepting one day, it never rose to the freezing point, in the city.—It appears by Mr. Wigglesworth's thermometrical observations --(published in the memoirs of the Boston Academy, for the year 1783,) that, at Cambridge in Massachusetts, in August, 1780, the mercury was at 92°. of Fahrenheit's scale.

† I have said "*less intemperate*"---The climate of England is, by no means, a temperate one. That country not only experiences great extremes of heat and cold; but the weather is remarkably variable and inconstant, with very frequent rains: The transitions from heat to cold, and from moisture to dryness---and *vice versa*---are sudden, and considerable in their degree. On the 18th of June 1788, the mercury, by Fahrenheit's scale, was at 88°. in London; and, on the 30th and 31st days of December, in the same year, it fell to 4½° at the city of Canterbury---On the 5th of January following, the mercury was at 5½° at the latter place. The weather was very severe, in England, from the 21st of December 1788, to the 11th of January 1789; during which term, the mercury rose twice to 44°. and once to 45°. Even at Sienna in Italy---in lat. 43°. 10'---during the same interval of time, the mercury fell, on the 31st of December 1788, to 10°; and, on the 11th of January following, it rose to 53°.---The observations at Canterbury and Vienna, were taken from two Sixian thermometers. (See Gent. Mag. for February and May, 1789.)---I also find, that, on the 21st and 22d days of last June, the mercury was at 86°. in London, by Fahrenheit's thermometer: and an English gentleman assures me, he has known a frost happen, in England, in the last week in July---Dr. Rush, in his account of the climate of Pennsylvania, mentions Mr. Rittenhouse's having informed him, that he had never passed a summer, during his residence in the country, without discovering frost in every month of the year, *excepting July*.

The winters, in our own country, † brace and invigorate the bodies of the people : and the genial warmth of our summers increases the\* generative principle of animal nature :—the cold is accompanied with a pure and † elastic atmosphere ; and, during the continuance of the greatest heats, the air is frequently † corrected by thunder-gusts and plentiful showers of refreshing rain.—The face of the country, too, is of such a nature, as must contribute to the salubrity of the climate—The United States are, in general, diversified with hills and vallies, mountains and plains : and Aristotle observes, that people do not feel the effects of age so soon, in hilly, as in flat countries.

What has been premised, concerning the longevity of the inhabitants of these states, will, I presume, be an ample refutation of those writers, who, influenced by European prejudices, or considering the subject in a superficial manner, have asserted, that the Americans are not so long-lived as the Europeans.

On the whole I trust, that the points, which it was my principal design to ascertain, have been satisfactorily established. With a view, however, to a further illustration of this interesting subject, I have formed the tables (which are annexed hereto,) shewing the numbers dying annually  
out

† Zimmerman, treating of the effects of a cold climate, says---“*Frigoris igitur perennitas, et artus, et integra corpora, comprimendo corroborat, efficitque ut naturam longè firmitorem, valentiorque induant.*”---Zool. Geograph.

\* From a table of the baptisms, marriages and deaths, at Paris, from 1745 to 1766 (both inclusive,) the Count de Buffon has shewn,---that the months in which the greatest number of children were born, are March, January and February ; and that those in which the fewest were born, are June, December and November : from which circumstance, he infers---that, in the climate of France, the heat of Summer contributes to the success of generation.---(Supplement to his nat. hist.)

† “The air in Pennsylvania, when dry, has a peculiar elasticity, which renders the heat and cold less insupportable than the same degrees of both are, in moister climates. It is only in those cases when summer-showers are not succeeded by North-West winds, that the heat of the air becomes oppressive and distressing, from being combined with moisture.” Dr. Rush’s account of, &c.

‡ “The heat of Summer seldom continues more than two or three days, without being succeeded by showers of rain, accompanied sometimes with thunder and lightning, and afterwards with a North-West wind,--which produces a coolness in the air that is highly invigorating and agreeable”---“There are seldom more than three or four nights, in a summer, in which the heat of the air is nearly the same as in the preceding day. After the warmest days, the evenings are generally agreeable, and often delightful.”---Dr. Rush’s account of the climate of Pennsylvania.

out of 1000 persons, in the city of Philadelphia, and the town of Salem in Massachusetts, at eleven different periods of life. The table for Philadelphia, (No. 1.) is constructed from the bills of mortality for the congregations of Christ-church and St. Peter's in this city, for† twenty-two years; viz. from Christmas 1754, to Christmas 1790, exclusive of fourteen years during that term. And the table (No. 2.) is formed from the bills for the same congregations, for the years 1782, 1788, 1789 and 1790: from which it will appear, that, although one-eighth of the whole number, in the bill for 1782, are stated to have died of the small-pox, the mortality has been less, taking the medium of these four late years, than the medium of sixteen preceding years gives it.—The table for Salem, in Massachusetts, is formed from the bills of mortality, for that town, for the years 1782, 1783, 1788 and 1790: But I have before observed, that the years 1782 and 1783 were unusually sickly; and this circumstance has, no doubt, exhibited the probabilities of life too low, for that town; especially, as I find the bill for 1788 makes the probabilities considerably higher, than the average of those four years. I have also given a general table of the probabilities of life, at the same periods of its duration,—formed from the estimates of the Count de Buffon;—one for the city of Paris, also from the estimates of that celebrated author;—and, likewise, tables for sundry other cities and places; which I have taken from those subjoined to Dr. Price's essay on the expectations of lives, and adapted to the same scale and the same periods of life, as the others.—Besides these, I have stated the proportions dying, annually, out of the whole number of the living, in a variety of places;—and the

† I was favored with these bills by Michael Hillegas, Esq.—The earliest is from Christmas 1754 to Christmas 1755; and the latest is for the last year, ending at Christmas. Mr. Hillegas furnished me with two others, viz. for the years 1756 and 1759; making, in the whole, twenty-four years: but, as there appears to have been a *very extraordinary* degree of mortality, among children under three years of age, during those years,—I left them out of my calculations. The bills for twelve other years, between 1755 and 1790, could not be obtained.



the proportions of those who die, after compleating the 80th year of their age, out of 1000 annual deaths,---for various cities, towns and countries.---A comparison of the results of these several tables, furnishes very interesting conclusions, in regard to the subject of the foregoing observations.

Although, in treating this subject, I have protracted my observations to a greater length than I had designed,—I cannot conclude without remarking, that the result of this investigation has afforded me great pleasure. — Must not the mind of every American citizen be impressed with gratitude, and glow with emotions of a virtuous pride, when he reflects on the blessings his country enjoys? Let him contemplate the present condition of the United States,—enjoying every advantage which nature can bestow—inhabited by more than three millions of the freest people on earth—and possessing an extent of territory amply sufficient to maintain, for ages to come, many additional millions of freemen, which the progression of its population is supplying, with wonderful celerity;—let him, also, contrast this situation of his country, with the condition in which it was found by our ancestors, scarcely two centuries ago;—and it will be impossible for him not to experience, in an exalted degree, those sensations, which patriotism and benevolence ever inspire!—

I am, Dear Sir,

With great Respect,

Your affectionate Nephew,

W. BARTON.

*Philadelphia, March*  
17th, 1791.

## OBSERVATIONS ON THE

TABLES, shewing the Probabilities of the Duration of Human Life, from the Birth up to ninety years of age---for divers intermediate Periods of Life;---at the City of Philadelphia, and at the Town of Salem in Massachusetts; and also in several parts of Europe.-----

GENERAL Table of the Probabilities of Life, from the Calculations of <i>M. Buffon</i> .			N <sup>o</sup> . 1. PHILADELPHIA, for twenty-two Years.		
Periods of Life.	Persons living.	Decrease of Life.	Periods of Life.	Persons living.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	591	409	Between the Birth and 3	612	388
3 and 5	540	51	3 and 5	555	57
5 and 10	490	50	5 and 10	511	44
10 and 20	450	40	10 and 20	465	46
20 and 30	392	58	20 and 30	368	97
30 and 40	323	69	30 and 40	270	98
40 and 50	252	71	40 and 50	178	92
50 and 60	180	72	50 and 60	114	64
60 and 70	101	79	60 and 70	52	62
70 and 80	27.63	73.37	70 and 80	20	32
80 and 90	3.54	24.09	80 and 90	5.61	14.39
N <sup>o</sup> . 2. (a) PHILADELPHIA, for 1782, 1788, 1789 and 1790.			SALEM (in Massachusetts) for 1782, (b) 1783, 1789 and 1790.		
Periods of Life.	Persons living.	Decrease of Life.	Periods of Life.	Persons living.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	611	389	Between the Birth and 3	----	----
3 and 5	569	42	3 and 5	555	445
5 and 10	546	23	5 and 10	505	50
10 and 20	497	49	10 and 20	470	35
20 and 30	400	97	20 and 30	342	128
30 and 40	296	104	30 and 40	252	90
40 and 50	195	101	40 and 50	169	83
50 and 60	140	55	50 and 60	129	40
60 and 70	62	78	60 and 70	94	35
70 and 80	25	37	70 and 80	26	68
80 and 90	6	19	80 and 90	(c)	
SALEM (in Massachusetts,) for 1790. (d)			PARIS, From the Calculations of M. Buffon. (e)		
Periods of Life.	Persons living.	Decrease of Life.	Periods of Life.	Persons living.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	----	----	Between the Birth and 3	----	----
3 and 5	550	450	3 and 5	585	420
5 and 10	503	47	5 and 10	524	56
10 and 20	487	16	10 and 20	485	39
20 and 30	356	131	20 and 30	433	52
30 and 40	293	63	30 and 40	366	67
40 and 50	220	73	40 and 50	293	73
50 and 60	178	42	50 and 60	212	81
60 and 70	120	52	60 and 70	116	96
70 and 80	42	84	70 and 80	32	84
80 and 90	15.71	26.29	80 and 90	4.50	27.50

LONDON; from the calculations of M. Buffon, (e)			LONDON; from the calculations of Dr. Price.		
Periods of Life.	Persons liv- ing.	Decrease of Life.	Periods of Life.	Persons liv- ing.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	---	----	Between the Birth and 3	492	508
3 and 5	587	413	3 and 5	426	66
5 and 10	553	34	5 and 10	374	52
10 and 20	522	31	10 and 20	325	49
20 and 30	436	86	20 and 30	272	53
30 and 40	332	104	30 and 40	219	53
40 and 50	222	110	40 and 50	148	71
50 and 60	138	84	50 and 60	97	51
60 and 70	72	66	60 and 70	50	47
70 and 80	25	47	70 and 80	16	34
80 and 90	3.20	21.80	80 and 90	2	14
VIENNA.			BRESLAW IN SILESIA, from the Calcu- lations of Dr. Halley.		
Periods of Life.	Persons liv- ing.	Decrease of Life.	Periods of Life.	Persons liv- ing.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	431	569	Between the Birth and 3	760	240
3 and 5	379	52	3 and 5	710	50
5 and 10	327	52	5 and 10	653	57
10 and 20	288	39	10 and 20	592	61
20 and 30	247	41	20 and 30	523	69
30 and 40	199	48	30 and 40	436	87
40 and 50	147	52	40 and 50	335	101
50 and 60	96	51	50 and 60	232	103
60 and 70	47	49	60 and 70	131	101
70 and 80	15	32	70 and 80	34	97
80 and 90	2	13	80 and 90	1	33
NORWICH, G. BRITAIN.			NORTHAMPTON, G. BRITAIN.		
Periods of Life.	Persons liv- ing.	Decrease of Life.	Periods of Life.	Persons liv- ing.	Decrease of Life.
	1,000			1,000	
Between the Birth and 3	544	456	Between the Birth and 3	585	415
3 and 5	498	46	3 and 5	544	41
5 and 10	440	58	5 and 10	496	48
10 and 20	394	46	10 and 20	448	48
20 and 30	341	53	20 and 30	379	69
30 and 40	290	51	30 and 40	318	61
40 and 50	233	57	40 and 50	247	71
50 and 60	168	65	50 and 60	177	70
60 and 70	94	74	60 and 70	107	70
70 and 80	31	63	70 and 80	40	67
80 and 90	4.22	26.78	80 and 90	3.48	36.52

PARISH of Holy-Crofs, Great-Britain.				PAIS DE VAUD, in Switzerland.				A Country parish in the Elefcorate of BRANDENBURGH.			
Periods of Life.	Perfons liv- ing.	Decreafe of Life		Periods of Life.	Perfons liv- ing.	Decreafe of Life.		Periods of Life.	Perfons liv- ing.	Decreafe of Life.	
Between the Birth and 3	1,000	283		Between the Birth and 3	1,000	265		Between the Birth and 3	1,000	313	
3 and 5	717	58		3 and 5	735	34		3 and 5	687	43	
5 and 10	659	70		5 and 10	701	48		5 and 10	642	65	
10 and 20	589	44		10 and 20	653	43		10 and 20	577	50	
20 and 30	545	59		20 and 30	610	47		20 and 30	527	41	
30 and 40	486	60		30 and 40	563	57		30 and 40	486	54	
40 and 50	426	73		40 and 50	506	75		40 and 50	432	58	
50 and 60	353	80		50 and 60	431	117		50 and 60	374	92	
60 and 70	273	102		60 and 70	314	146		60 and 70	282	116	
70 and 80	171	81		70 and 80	168	122		70 and 80	166	122	
80 and 90	90	81		80 and 90	46	41		80 and 90	44	41	
	7	83			5				3		

Number of the Deaths out of 1,000, under the ages of 3 and 5 years, refpectively,--- for Ifswich Hamlet, in Maffachufetts, Hingham, in the fame ftate, and for the city of Berlin.---

IFSWICH HAMLET, on a medium of 10 years	{ under 3 years,	Deaths,
	{ under 5 do.	181
HINGHAM, on a medium of 54 years,	{ under 3 do.	---
	{ under 5 do.	363
BERLIN, from the bills given by M. Sufmilch,	{ under 3 do.	516
	{ under 5 do.	598



# DURATION OF HUMAN LIFE.

35

The numbers of those who die, after compleating their 80th year of age---proportioned to the whole numbers of Annual Deaths;---at the following places, respectively; viz.

Names of the Places.	Proportions, out of 1000 deaths.
1. Ipswich-hamlet, Massachusetts 10 years,	128 survive 80 years.
2. Parish of Holy-Crofs, Great Britain,	90. 91
3. Hingham, Massachusetts---54 years,	75. 47
4. Connecticut---the whole state,	74.
5. Milford, Connecticut---12 years,	74.
6. Europe, <i>averaged</i> , according to Mr. Kerseboom,	71.
7. The Pais de Vaud, in Switzerland,	46. 50
8. A country parish in Brandenburg,	44. 44
9. Northampton, Great Britain,	40.
10. Breslaw, according to Dr. Halley,	34.
11. Paris, deducting children sent to the country; M. Buffon,	31. 84
12. Norwich, Great Britain,	31.
13. According to M. Buffon's <i>general</i> table,	27. 63
14. Berlin,	27.
15. Salem, Massachusetts---1788, 1790,	26.
16. Philadelphia---1782, 1788, 1789, 1790,	25.
17. { London---according to M. Buffon, See note (j)	{ 24. 56
{ Do. according to Dr. Price,	{ 16. 46
18. Edinburgh, do.	24.
19. Vienna,	15.

The proportions which the numbers of annual deaths bear to the whole numbers of the living---at the following places, respectively; viz.

1. The Island of Madeira---	I to 50
2. Salem, in Massachusetts--- (f)	I to 47
3. Philadelphia---The city and suburbs,	I to 45
4. A country parish in Brandenburg,	I to 45
5. The Pais de Vaud,	I to 45
6. 1098 Country parishes in Germany,	I to 43
7. The kingdom of Sweden,	1 to 38. 60
8. Montbard, in Burgundy--- (g)	1 to 36
9. France,	I to 35
10. England,	I to 53
11. The parish of Holy-Crofs, near Shrewsbury, Great Britain,	I to 33
12. Paris,	I to 32. 50
13. The Dukedom of Wurtemberg,	I to 32
14. Savanna, in Georgia--- (b)	I to 31. 70
15. Breslaw,	I to 28
16. Berlin, (i)	I to 26. 50
17. Northampton, Great Britain,	I to 26. 50
18. { London, (j)	{ I to 26
{ do. according to Dr. Price,	{ I to 20. 75
{ Edinburgh--- (k)	{ I to 26
19. { do. according to Dr. Price,	{ I to 20. 80
{ do. according to Mr. Maitland,	{ I to 28
20. Amsterdam,	I to 24
21. Rome,	I to 23
22. Dublin,	I to 22
23. Leeds, in Yorkshire, Great Britain, (l)	I to 21. 60

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The

The proportionate numbers of Annual Deaths, to 100 Annual Births; at the following places, respectively;—viz.

Names of the Places.	To 100 Births	N <sup>o</sup> . of Deaths.
1. Salem, in Massachusetts, for 1782 and 1783—including the still-born in the number of deaths,	To 100 Births.	49. 00
2. Hingham, in Massachusetts, for 54 years,	do.	49. 50
3. Philadelphia---City and suburbs,	do.	50. 00
4. The kingdom of Prussia, for 4 years, ending in 1718,	do.	57. 43
5. The Island of Madeira,	do.	58. 75
6. All the king of Prussia's dominions in Germany, &c. exclusive of Prussia; 4 years, as above,	do.	71. 00
7. The kingdom of Prussia, in 1766,	do.	72. 50
8. Sweden, for 1774, 1775, 1776 and 1777,	do.	72. 86
9. France, from 1754 to 1763,	do.	76. 94
10. England,	do.	80. 00
11. City of Brunswick, in Germany---1764 and 1767,	do.	80. 97
12. The Island of Corfica,	do.	81. 00
13. Manchester, in Great Britain---1764, 1766, 1768, 1771, and 1777,	do.	82. 57
14. Dantzic---1717, 1718, 1720 and 1721,	do.	85. 77
15. Koningsberg---1766, 1768,	do.	87. 49
16. Duchies of Holstein and Sleswic---1765, 1767,	do.	88. 23
17. Whitby, in Yorkshire, Great Britain---1767, 1768, 1772 and 1777,	do.	88. 45
18. Norwich, Great Britain---1768, 1774 and 1777,	do.	92. 96
19. Denmark and Norway, in 1764 and 1765; and do. including the Danish dominions in Germany, in 1766,	do.	93. 17
20. Paris---14 years, viz. from 1771 to 1784---M. de la Place,	do.	97. 65
21. Do.---22 years, viz. from 1745 to 1766. --M. de Buffon,	do.	99. 34
22. City of York and suburbs, Great Britain---1768, 1770,	do.	100. 75
23. Paris, 1781, and 1782, M. de la Place,	do.	101. 24
24. Do. according to M. de Buffon,	do.	101. 36
25. Do. according to Dr. Price's statement of the numbers of births and deaths, there,	do.	101. 57
26. Copenhagen---1765, 1766, 1767, 1771, and 1772,	do.	101. 81
27. City of Freyberg, in Saxony---for a whole century, ending in 1717,	do.	102. 92
28. Paris---from 1764 to 1773, both inclusive, and 1775, 1778, according to Mr. Anderson,	do.	103. 49
29. Chester, Great Britain---4 years,	do.	107. 42
30. Liverpool, Great Britain---5 years,	do.	112. 70
31. Norwich, Great Britain---30 years,	do.	114. 09
32. Breslaw, in Silesia,	do.	119. 50
33. Vienna,	do.	121. 43
34. Copenhagen,	do.	122. 22
35. Northampton, Great Britain,	do.	123. 23
36. London---26 years---From the bills of births and deaths, during that term,	do.	124. 92
37. Berlin---5 years, ending in 1759,	do.	131. 00
38. Rome,	do.	138. 43
39. Amsterdam,	do.	169. 56
40. do. from 1764 to 1768, both inclusive, and 1771, 1772,	do.	171. 95

(a) Out of 198 deaths, in the congregations of Christ-church and St. Peter's, from Christmas 1781 to Christmas 1782,---24 died of the small pox, 21 of purging and vomiting, and 27 of fits and convulsions. The average number of deaths, in the same congregations---during the years 1788, 1789 and 1790---is only 145; and not quite 145. 7-8, during the 22 years, from which the table for Philadelphia N<sup>o</sup>. 1 is formed--The deaths, therefore, in 1782, exceeded the average number of those for the 22 years, in the proportion of 136 to 100: and, consequently, the year 1782 was unusually sickly in Philadelphia, as well as at Salem in Massachusetts. In the year 1789, also (viz. from Christmas 1788 to Christmas 1789,) out of 164 persons, who died in the congregations of Christ-church and St. Peter's, 29 died of the measles. From these circumstances, it is reasonable to suppose---that even the *second* table for Philadelphia gives the probabilities of life too low, for this city; because, out of the *four* years above mentioned, one was more sickly than common; and, during another, near one eighth of the deaths from which that table is formed, were occasioned by a disorder not annually epidemic.---In the year 1782, there died between the age of 80 and 90 years, out of 198,---3 persons; in 1788, out of 126,---1; in 1789, out of 164,---3; and in 1790, out of 145,---5; being, in the whole, 12 out of 633: and this gives the proportion of 6 persons, out of 1000, attaining to 90 years of age.

(b) The measles having been very mortal at Salem, in 1783,---that year has been omitted, in calculating the proportion of deaths, for the first twenty years of the ages.

(c) The number of deaths at Salem, exclusive of the still-born, during the years 1782, 1783, 1789---averaged 167½ per annum; and the number of those who died between 80 and 90 years of age, during the same term, averaged 4 per annum---This gives the proportion of those dying, between the 80th and 90th year of life, in that town, as 23. 88 out of 1000 deaths. The bills for 1782 and 1783 do not notice any deaths, *after* 90 years of age, and this is also the case, with the bill for 1789: but, in the two former, the lists of ages comprehend 36 deaths of "*ages unknown*," and, in the year 1790, three survived 90 years of age.---See the table for Salem, for the year 1790.

(d) Out of 191 deaths, from which this table is found, two were between the age of 90 and 100 years, and 1 at 103 years.

(e) According to M. Buffon, the proportion of deaths, at Paris, in the two first years of life, is 313, 21 out of 1000; and, at London, 334. 59, out of 1000. The number of deaths, he observes, is greater at Paris than in London, from two years of age to five; less at Paris than at London, between 5 and 50 years; pretty nearly equal, in both cities, between 50 and 60; and much greater at Paris than at London, from the 60th year of age to the end of life.---This shews, continues M. Buffon, that *old age* is, in general, much less in London than in Paris: for, out of 1000 persons, 212 died after completing their 60th year, at Paris; whereas, only 138, out of 1000, died after that age, at London.---The continual supply of people, mostly from about twenty years of age and upwards, which great cities draw from the country, gives the proportion of those who die at *old age*, in such cities, much higher than the number of those *born* in them would give. Hence the favorable appearance, with respect to longevity, which many great cities exhibit, is extremely fallacious: and this observation is particularly applicable to London, where the continual diminution of the number of its inhabitants, occasioned by the great excess of deaths beyond the births, renders such supplies necessary, to support its population.

(f) The still born are included, in the number of deaths.

(g) This town contains, according to M. de Buffon, 2337 inhabitants.

(h) From the 1st of July, 1790, to the 1st of July, 1791, the number of deaths at Savannah, was in the proportion of one out of every 31 7-10 of the total number of *white* inhabitants (exclusive of Mariners and Sojourners) in that city. It appears by the census, that, in January 1791, Savannah contained 1712 white inhabitants.---

(i) Berlin contains, according to Dr. Price, 134,000 inhabitants.

(j) Dr. Price supposes the proportion of annual deaths to the whole number of the living in Edinburgh, to be nearly the same as in London.---I have therefore given the proportion of one to twenty-six, for both cities; and my reasons for assuming *this* proportion---which differs considerably from that stated by Dr. Price---will appear, in the course of the foregoing observations.---

(k) By the London Bill of Mortality, made up from the 16th of Dec. 1788, to the 15th Dec. 1789, it appears---that, in the 123 parishes in London and Westminster, and the 23 *Out-parishes* in Middlesex and Surry, 20,749 persons were buried within the year. Of this number, those who died after completing the several periods of age, after mentioned, give the following proportions, viz.

(l) This town contained, in the year 1770,---16,380 inhabitants,

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# 38 OBSERVATIONS ON THE &c.

Out of 1,000 deaths, there died---upwards of 100 years of age.		0. 4 <sup>3</sup>
Do.	90	3. 66
Do.	80	23. 66
Do.	70	76. 34
Do.	60	146. 46
Do.	50	227. 72
Do.	40	318. 95

These proportions correspond so nearly with those given by M. Buffon, in his estimate of the probabilities of life, for London, as to induce a belief, that the calculations of that celebrated Philosopher may be depended upon, in this instance.

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